overall connections. This growth alone puts increasing demand on our network and its spectrum resources.

(3) The mix of devices is shifting toward more bandwidth-intensive devices. Each month, a greater percentage of the devices our customers use are essentially personal computers that can access the Internet and engage in a wide variety of other uses of broadband services. While 28% of our postpaid customers had smart phones as of 4Q10, that percentage grew dramatically in just the next year, reaching 44% in 4Q11 – including a 5% increase in just one quarter and a 16% increase year over year – and we expect that soon more than **[BEGIN CONFIDENTIAL] [END CONFIDENTIAL]** of our customers will have smartphones. We sold 7.7 million smartphones in 4Q11 alone – fully 2.1 million more than we sold in 3Q11, and 70% of postpaid phone sales were smartphones. This too drives up network demand, because customers' use is shifting rapidly toward more broadband data services to benefit from the growing number and variety of applications – there are more than one million apps for the iPhone alone.

12. Ultimately, as wireless data usage expands, speed becomes an increasingly important end-user consideration to customers. High-speed network access is critical for applications that require high responsiveness, like two-way video communications. Alternatively, degraded speeds have a significant impact on the customer's experience and productivity, particularly for bandwidth-intensive applications and services. Premier quality of service is a very important feature of the Verizon Wireless experience. Verizon Wireless thus engineers its 4G LTE network to provide customers not only with quick and reliable connections, but with access to

speeds that users will grow to expect as the norm – for LTE, typical download speeds of 5–12 Mbps and upload speeds of 2–5 Mbps.

13. The graph below shows both historical and projected downloaded busy-hour data on our network, and illustrates the extraordinary growth in our customers' use of data services. Starting from zero in early December 2010, LTE traffic (the blue curve) shows a sharp increase in just the first year of its availability, and we project **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]

Spectrum Planning Shows More Spectrum Is Needed to Serve Customers.

14. Verizon Wireless, like other carriers, must constantly assess whether it has sufficient spectrum to meet the needs of its customers, because spectrum is the raw material for all of its services and substantial lead time is required to acquire and plan for use of spectrum. Calculating spectrum needs depends on many variables and cannot precisely determine at what point in the future spectrum resources will become constrained. In fact, as detailed in my initial declaration, data traffic has grown faster than our previous projections.

15. Moreover, capacity demands are not uniformly distributed across our network or even within individual markets. Thus, spectrum capacity must be assessed market by market and cell site by cell site, and even sector by sector, based on our mix of spectrum capacity and elements of demands both across the network and within individual markets, in the latter case to accommodate highly concentrated usage demands from, as examples, a university, a stadium, or a highway.

16. Usage trends also can vary tremendously throughout the year, as in the case of communities – including rural areas – that have high tourist or vacation traffic. Spectrum of course is not acquired at the cell site level, so we must secure spectrum in a geographic area in large enough amounts to guard against constraints occurring anywhere in that geographic area, even though as discussed below constraints will typically be seen first in heavily populated areas and business districts. As I noted in my initial declaration, planning and deployment is a multi-year process; we need to identify and acquire spectrum today to be prepared for network demands years into the future.

17. The network may experience constraints in rural areas despite fewer overall connections. We expect some customers in these areas may rely on their wireless broadband

connection more intensively than customers in urban areas where alternative high-speed broadband connections are more widespread. We also expect that new products will further increase data traffic in rural areas. In **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** Verizon Wireless will begin to offer a new product called Fusion which was recently demonstrated at the 2012 Consumer Electronics Show. Fusion will use LTE fixed wireless equipment to provide an entire home or business with broadband service. We anticipate that the data usage of these products will be significantly greater than that of a smartphone, exceeding **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** by YE 2012 and approaching **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** by YE 2016. In many cases, just one person or office using increased amounts of capacity can have significant impact on a rural cell site.

Mapping Network Constraints Using Current Spectrum Holdings

18. In my initial declaration I summarized the methodology Verizon Wireless employs on an ongoing basis to project future spectrum constraints across its LTE network. I explained generally how we collect data traffic and performance metrics such as data volumes, average user throughput, historical handset sales data and how we develop projections on future handset sales, customer data usage trends, and usage trends for new mobile applications. The data are used to forecast future data traffic in each sector of each cell site. We then convert the amount of projected data traffic to the amount of spectrum needed to meet demand and service level requirements, as the amount of spectrum available generally correlates to the amount of traffic a site or sector can handle while meeting the speed and service quality metrics for our network.

Below I provide additional information about our spectrum planning methodology and show how it yields spectrum capacity needs in diverse sample markets across the country.

19. **The Verizon Planning Instrument.** Verizon Wireless has developed a capacity and spectrum planning tool, the Verizon Planning Instrument ("VPI"), to monitor and calculate capacity needs on its EVDO and LTE networks. **[BEGIN CONFIDENTIAL]**

[END CONFIDENTIAL]

20. The VPI analysis focuses on download volumes, which are a better indicator of spectrum demand than upload volumes. Consumers generally download greater volumes of information than they upload, and thus spectrum constraints impact download network performance first. We also use busy hour traffic, since that is the time of day with the greatest demand on the network. Just as electric companies must build for peak hourly loads, we design our network for those loads. **[BEGIN CONFIDENTIAL]**

[END CONFIDENTIAL]

21. **Capacity Constraints per Cell Site Sector and the Consumer Experience.** Next we consider how these projected data levels would impact service levels and our customers' experience on the LTE network. Our involvement with LTE over the past year has demonstrated that a fully loaded cell site sector using our 700 MHz C Block spectrum to provide LTE has a projected capacity today of up to **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** while still maintaining the speeds we seek to provide to all consumers in that sector.

22. As traffic volumes exceed the data threshold, some customers will experience decreases in speed and quality, depending on the mix of use occurring at that point. Most affected will be services like video streaming and real-time two-way video conferencing. For example, a customer who is streaming video or downloading a large file is more likely to notice increased jitter or longer buffering times, while a customer on a static web site may not notice a slower speed. The further data traffic exceeds the threshold, the more widespread and substantial the degradation in customers' experience becomes. Thus while some customers using speed-intensive services like streaming in sectors at or close to the threshold will experience slower speeds, virtually all customers in sectors far exceeding the threshold will experience noticeable reductions in speed and diminished quality. Even those customers who are not downloading information or otherwise not using speed -intensive services could experience slower speeds. Real-time applications will be impacted to a greater and greater extent as available bandwidth per user continues to decrease. As latency or packet congestion continues to build in the

network, application requests for retransmission of frames may take place, further degrading the user experience.

23. Because we seek to provide all customers with the highest quality user experience our network can deliver, we are committed to developing network plans to add capacity before data traffic exceeds these thresholds. This point bears emphasis. Verizon Wireless is committed to provide all of its customers with the highest-quality experience. To accomplish that, we must ensure we have the right network deployment and sufficient spectrum in every cell sector to manage growing data traffic. The methodology I describe above is new for LTE because we are deploying the first widespread LTE network not only in the United States but in the world. We will continue to refine it as we gain more experience with LTE. However, it leverages our experience with EVDO and provides a reasonable way to calculate how the rapidly growing demand for broadband services will impact the company's existing spectrum position – and what spectrum it will need in the future.

24. **Deploying Capacity Enhancement Strategies.** Our LTE network development plans assume only our current spectrum holdings but take into account technology advancements we will incorporate to achieve additional capacity gains. The data traffic threshold to determine if a sector is spectrum constrained increases with time as we benefit from the practical use of these new tools to augment capacity including, among other investments, adoption of the LTE Advanced standard and deployment of LTE small cells.

25. While we have determined that the data traffic threshold for spectrum constrained-sectors using our 700 MHz Upper C Block spectrum should be **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** at YE 2013, we expect the threshold to be higher by YE 2015 due to our plans to aggressively deploy capacity-

enhancing techniques. One of the most promising such techniques is the use of LTE small cells. Verizon Wireless will begin implementing LTE small cells **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL] Unlike macro cells, small cells have a more limited footprint and are typically deployed in high traffic areas to de-load traffic from the macro cell. Small cells typically have a maximum coverage area of up to several hundred meters and provide overall system capacity benefits because the RF is confined to a much smaller area than a macro cell. Small cells effectively increase the overall capacity of the macro cell coverage area in which they operate. As the technology becomes available and matures, Verizon Wireless will be deploying small cells aggressively to increase system capacity.

26. Even with the deployment of small cells on a scale of **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** this will not be adequate to keep pace with the projected customer growth in years 2013 to 2015 and beyond. This is because our projected growth in data LTE usage from YE 2013 to YE 2015 will far outstrip the added capacity made available by small cells. Further, LTE small cells are unlikely to be available in the quantities we would need until sometime in **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** past the date when many cell sectors will be exceeding desired capacity during busy hours. Additionally, the deployment of small cells is not without challenges (and risks to the deployment schedule). For example, providing backhaul to **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** of small cells is one of the many challenges that must be overcome. Installing small cells also requires us to secure necessary approvals from site owners,

which can include time-consuming negotiation of site leases, and we may not be able to secure those arrangements for locations which are most optimal for the use of small cells.

27. **Deploying Existing Verizon Wireless AWS Spectrum Holdings.** Verizon Wireless has 20 MHz of AWS spectrum in markets covering the eastern part of the nation, and the company plans to use this spectrum in the LTE network **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** in addition to the 700 MHz C Block which is in service. During the past several years, Verizon Wireless has taken significant steps and incurred major expense both to clear the AWS spectrum and develop LTE handsets that will operate in the AWS band.

28. We completed our first microwave incumbent relocation in 2008 (just two years into the 15 year license term of our AWS licenses), and the pace has increased significantly over time. In 2010, for example, there were 131 incumbents on our AWS spectrum with 358 microwave paths. Today there are just 34 incumbents with just 88 paths. Since 2008, Verizon Wireless has incurred nearly $7 million in relocation expenses. In addition, Government users have also needed to clear the AWS band. In 2010 there were 109 non-classified Government links in our AWS spectrum – today there are 25 and some of those aren't expected to be cleared until June 2012.

29. Verizon Wireless plans to introduce dual band (700 MHz and AWS) LTE devices **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** Those devices have been in the planning and development stage for **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** The dual band LTE devices will be seeded into the marketplace **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** to ensure that as many

customers as possible have the dual band devices, thereby reducing capacity constraints on the 700 MHz spectrum **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL] Dual band handsets will support voice applications on both frequency bands. Again, like the small cell example above, deploying the available AWS spectrum where available will not be adequate to keep pace with the projected customer growth in those areas in years 2013 to 2015 and beyond.

Market by Market Review

30. In this section I describe projected capacity constraints in numerous markets of varying size across the country. Maps depicting the capacity constraints are included at the end of my declaration for a total of 18 large and small markets across the United States. In each case, our projections show that existing spectrum will not meet demand by the end of 2015 across these markets, and in most markets, by as soon as the end of 2013.

31. As explained above, Verizon Wireless's data threshold for cell site sector spectrum constraint for 10x10 MHz LTE is **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** for YE 2013. Further, in any market in which Verizon Wireless has both 700 MHz C Block and AWS spectrum, we use thresholds twice this high **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** to account for use of AWS spectrum beginning in **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]**, because adding AWS doubles our spectrum available for LTE and enables a total of 20x20 MHz for LTE in those markets. The color scheme for the maps is as follows. By the end of 2013, a sector that is colored yellow is projected to exceed the **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]**

([BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] for markets in which we hold AWS spectrum) during busy hour, meaning that some customers served by this sector will experience decreases in speeds, depending on the data services they are accessing. In sectors marked red, more customers are likely to experience a more widespread and substantial degradation in speed and quality of some of their data services. By the end of 2015, red sectors are forecasted to be spectrum constrained. If the increase in capacity due to small cells and other technology advancements does not occur as anticipated, many more sectors, the ones shown as yellow, could also be spectrum constrained by that time. Again, in those markets where Verizon Wireless currently holds AWS spectrum, the maps double the data thresholds for marking a cell site sector yellow or red. It is apparent from the maps that we face capacity constraints in some parts of markets where we hold AWS as well as 700 MHz spectrum – including **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**– as early as the end of 2013. Below I describe the impact in three specific markets.

32. **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** Verizon Wireless is currently providing LTE on its 700 MHz spectrum and holds no AWS spectrum in this market. The actual data traffic for YE 2011 and our data traffic projections for YE 2013 and YE 2015 are depicted on the attached maps, which show the locations of all operational LTE cell sites in the highest-density part of this market, the city of **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** and surrounding area, as of the three dates. Most cell sites shown are comprised of three sectors. Each sector is color-coded to show whether we project capacity to be below or above the **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY**

CONFIDENTIAL] spectrum constraint thresholds. The map for YE 2011 actual data traffic shows that, in all sectors, the customer experience during this period was within acceptable levels.

33. In 2013, however, many of **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** cell site sectors are projected to become spectrum constrained due to the increasing demand being placed on the network – even with infrastructure enhancements and initial technology improvements. These sectors are shown on the map in yellow and red. The red sectors are of greatest concern because they are substantially above our design criteria for 2013 and therefore many customers served by these sectors are likely to experience slower speeds during many hours each day. Further, the map shows that the negative impacts on customers due to the lack of spectrum will typically appear first in high usage areas like the downtown business core. By the end of 2015, the spectrum shortage has spread well beyond the urban core of the market, and nearly all sites have sectors colored red, meaning that, absent deployment of additional spectrum, customers in this market will experience major impacts to speed and quality of service, such as latency and responsiveness of applications.

34. **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** The significant impact on Verizon Wireless' LTE network capacity of rapidly growing traffic is not confined to larger markets – it includes smaller markets as well. For example, the maps for **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, with a population of only about half a million, depict the actual data traffic for YE 2011 and our data traffic projections for YE 2013 and YE 2015. Like **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, Verizon Wireless has no AWS spectrum on top of its existing 700 MHz C Block spectrum to absorb increasing

demand. Even though the population of this market is less than a fifth of **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, the impact of data demand is very similar. Many sectors will experience spectrum constraints starting in 2013 (yellow and red). In 2015, the spectrum constraints will be severe (as indicated in red) in the majority of the cell sectors.

35. **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** The company's need for additional spectrum is not confined to markets where it only has 700 MHz spectrum, but exists in markets where it will deploy AWS spectrum as well. As discussed above, in markets such as **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** where Verizon Wireless holds 700 MHz and AWS licenses, we double the spectrum constraint thresholds. By YE 2013, **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, the sectors shown in yellow and red are forecasted to be spectrum constrained. The red sectors are of greatest concern because they are substantially above our design criteria for 2013 and therefore many customers served by these sectors are likely to experience slower speeds during many hours each day. And by YE 2015, absent deployment of additional spectrum beyond the 700 MHz and AWS spectrum that the company currently holds, most cell sectors are projected to be red, meaning that customers across the **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** area will experience reduced speeds and quality.

36. **Additional Examples of Spectrum Constrained Markets.** The need for spectrum is evident from data traffic projections in many other large and small markets, including the 15 markets depicted in the additional attached maps: **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]. These markets represent various differences in population, urban business cores, geography, broadband usage characteristics, as well as a mix of markets with and without 10x10 MHz of existing AWS spectrum. As is shown in the attached maps, which depict the same time periods as the maps for **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, all share roughly the same trends for spectrum exhaust.

37. As in the examples identified above, cell site sectors are projected to become spectrum constrained due to the increasing demand being placed on the network by YE 2013. Despite upcoming use of new advancements such as LTE small cells and LTE Advanced, and despite the 700 MHz (and in some cases AWS) spectrum already held by Verizon Wireless in these markets, the maps show that customers in these markets will experience major impacts to speed and quality of service absent additional spectrum.

38. Verizon Wireless regularly conducts similar demand projections in the markets where LTE has been deployed and the results are comparable. In market after market, the burgeoning customer demands for data and particularly their use of speed-intensive broadband services is driving up traffic on the network. Whether the "tipping point" is reached in 2013, earlier or later, the plain fact is that the company needs to secure this spectrum if its customers are to continue to experience the high quality of data service they have today.

Other Approaches to Address Capacity Demand Have Either Been Deployed, Will be Deployed as They Become Commercially Available, or Are Not Feasible.

39. Historically Verizon Wireless has used numerous methods to increase spectral efficiency, and we will continue to do so as we move forward with LTE. As noted above, the

company intends to deploy LTE small cells extensively **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL] and will undertake other investments to increase LTE capacity. However, these network enhancements by themselves are not close to sufficient to meet our growing capacity needs. We need to add additional spectrum resources, and we need it soon in order to place the spectrum in use in sufficient time to address demand.

40. As an initial matter, Verizon Wireless is today – and post-transaction will continue to be – one of the most efficient users of spectrum. Today, the company services approximately 109 million wireless connections, more than any other wireless provider, using an average of 89 MHz nationwide – or an average of one megahertz of spectrum per 1.23 million customer connections. Post-transaction, we would remain among industry leaders in term of efficiency, having on average 109 MHz nationwide and an average of one megahertz of spectrum per one million customer connections. These spectrum efficiency standings demonstrate that over the years the company has invested heavily in cell density to make efficient use of our spectrum. The company has invested $6-8 billion in network development each year over the past four years, and given our nationwide coverage, this investment has primarily been directed at next-generation technologies that deliver spectrum-efficiency enhancing upgrades and capacity deployments.

41. Some commenters suggest that, if Verizon Wireless were to deploy certain technology solutions – cell splitting, femto cells, Wi-Fi, and refarming, for example – the company's existing spectrum resources could address our customers' upcoming capacity constraints. These solutions are well-known to Verizon Wireless' network engineers, and several are part of Verizon Wireless' capacity enhancement arsenal. Indeed, some are regularly

used to address capacity needs where feasible. However, these tools simply cannot keep up with the extraordinary growth of demand on our networks. Below we describe several purported solutions.

42. **Cell Splitting.** Cell splitting (construction of additional macro cells) can be an effective tool in spot situations, but the notion that cell splitting can solve Verizon Wireless' capacity constraints is simply not realistic. When many sectors are projected to become spectrum constrained, we cannot keep up with high and widespread growth by using cell splitting alone.

43. Verizon Wireless nonetheless plans to deploy **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** While cell splitting is sometimes effective and practical to meet increased demand, the benefits of that technology are limited. As we place more and more sites close together, the benefits of additional sites diminish, particularly relative to the zoning, equipment, construction and other expenses necessary to deploy more sites. Further, to obtain the maximum capacity gains from cell splitting, we must be able to locate a new cell in a relatively specific spot or small geographic area – which is limited by the availability of tall structures or the ability to construct a tower. Indeed, cell splitting often does not deliver the expected gains due to real estate constraints that limit where we can build new cell sites.

44. Further, in many instances cell splitting is not a strong alternative due to cost. For instance, the average cost of a new cell site is **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL** although this cost can approach **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]** in rural areas where unusual construction may be required or lengthy high capacity backhaul facilities to support LTE

may need to be purchased. Moreover, a cell split only provides a capacity benefit to 3 sectors at adjacent cell sites. For that same cost we can typically **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** if we activate available spectrum. The ongoing recurring costs are also much higher for cell splitting compared to activating available spectrum. Typically the recurring costs are two to four times higher for new cells compared to activating available spectrum. In addition cell splitting is a slow and time consuming process. Putting available spectrum to use can be achieved much faster than cell splitting.

45. **Femto Cells.** As noted above, Verizon Wireless will deploy LTE small cells to enhance capacity across the network in the coming years, but the suggestion by some commenters that femto cells (with far smaller coverage areas) can solve capacity constraints is not accurate. Femto cells are located on customer premises and use the carriers' authorized frequencies to communicate with the user's devices, but they carry the traffic to and from the carrier's network over a separate Internet connection, thus reducing the capacity demands on the carrier's network. Verizon Wireless has deployed many 3G femto cells and has plans to deploy a substantial number of LTE femto cells after they become available in **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]**. While femto cells provide some congestion relief, they will never be able to meet the skyrocketing demand that I detailed above, because they offload only a small fraction of a sector's traffic. Moreover, femto cells are much less effective at providing capacity when deployed close to a macro cell.

46. **Wi-Fi.** Verizon Wireless invests in Wi-Fi networks on a limited basis where spectrum constraints are extremely severe, for instance in stadiums and concert halls, but generally does not view Wi-Fi offloading as a good solution to congestion. First, most Wi-Fi

networks are owned by third parties that generally are not in the business of offering wireless services, and offer Wi-Fi as an enticement to purchase other products like coffee or hotel stays. These providers do not offer the same security, reliability, and user experience that Verizon Wireless has built its reputation on. Second, Wi-Fi uses unlicensed spectrum and it is difficult to control interference that can greatly degrade the capacity of a Wi-Fi access point and thus impact the customer experience. Given the company's commitment to providing the highest possible quality and reliability of its services, Verizon Wireless has determined not to force customers onto Wi-Fi networks. Rather, we believe that the most consumer-friendly solution is to provide LTE in tandem with Wi-Fi services, giving consumers the ultimate power to choose between the two services. We do this by providing our customers Wi-Fi capable devices that make it easy for the customer to select Wi-Fi through the settings menu or in some cases notifying the customer of available Wi-Fi networks as the device detects their availability. Finally, while many of our customers do choose Wi-Fi and will certainly continue to do so, our data traffic projections already factor this behavior into the calculation and the conclusion remains the same – the demand for wide-area broadband service requires additional spectrum.

47. **Refarming of Cellular and PCS Spectrum.** Transitioning Verizon Wireless' PCS and cellular spectrum from EVDO and voice services to LTE is not a realistic alternative to address the significant and pervasive networks constraints we will face over the next few years. As an initial matter, overall traffic continues to increase on the EVDO network even as some customers migrate to the LTE network. (See the graph accompanying Paragraph 13 above.) Thus while traffic is migrating to LTE, spectrum deployed for EVDO is not fallow, but is filled by the growing data demands of remaining users. Put another way, customers are not yet moving to LTE fast enough to stop, and reverse, EVDO traffic growth. Our separate projections

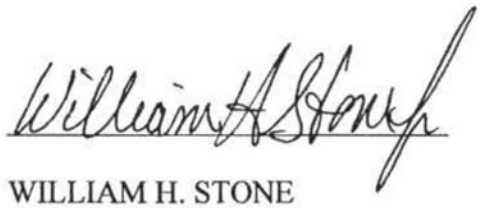
on EVDO network usage indicate that the growth in EVDO usage is expected to continue until **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, by which time the rate at which users switch to LTE is forecasted to become high enough to overcome the growth in data demand for the EVDO customers that remain. While Verizon Wireless will likely offer various incentives to customers to upgrade to LTE devices, many customers will choose not to transition and we plan to support those customers by continuing EVDO for many years into the future. Further, there are many M2M modules that are integrated into other products such as vehicles that cannot be easily upgraded. Those devices will continue to rely on the EVDO network until they are retired or replaced by products that use LTE modules – a process that will take many years.

48. Additionally, we are presently seeing continued growth in usage of our EVDO network, which itself is spectrum constrained in various markets. Once EVDO growth subsides, it will take time before sector traffic returns to a more normal level, and then additional time before traffic subsides further to allow refarming in some markets. Initially, refarming opportunities will occur with 1.25x1.25 MHz channels and only on a piecemeal basis. For LTE, Verizon Wireless has deployed service using 10x10 MHz channels to meet customer expectations for speed. A 1.25x1.25 MHz LTE channel can only support peak speeds that are $1/8^{th}$ of the peak speeds on a 10x10 MHz channel, and thus is not a viable solution due to the inconsistency in the customer experience. At a minimum, Verizon Wireless will require 5x5 MHz channelization for LTE deployment in refarmed spectrum in order to achieve a significant benefit from deployment. The earliest timing for freeing up 5x5 MHz of such spectrum for LTE deployment is **[BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]**, and that will occur on a piecemeal basis and likely in the more lightly

loaded cells (the cells shown in green on the attached sample market maps) where we do not need additional capacity. Simply put, the future refarming of spectrum used to support EVDO will not address growing spectrum demand.

49. **Lower 700 MHz Spectrum.** While we hold various Lower 700 MHz Band licenses, this spectrum is not as suitable for our LTE capacity requirements in the near term. First, Lower 700 MHz A and B bands are difficult for us to include in our LTE devices because our devices must support both the 700 MHz Upper C Band and AWS. The Lower 700 MHz Band requires an additional duplexer in each device because of the spectral distance between the Upper and Lower 700 MHz bands, and this is particularly challenging because it is more complex to add a duplexer that operates below 1 GHz. (These device design issues are not faced by other Lower A and B licensees which do not hold 700 MHz Upper C Block spectrum.) Second, our ability to deploy service on various A Block licenses is complicated by FCC rules that require us to avoid interference to Channel 51 reception by TV receivers in some of the markets where we hold A Block licenses, and by the need to plan for potential interference from adjacent bands licensed for high-power operations. Third, in many markets we hold a Lower Band A Block or a B Block license but do not hold both. A or B alone only provides us with a 5 X 5 block of spectrum, which cannot deliver the throughput we design for on the larger Upper 700 C Block and AWS spectrum bands. These issues may not affect other 700 A and/or B Block licensees, but they contributed to our decision to focus on the use of AWS as the most suitable spectrum for adding to our LTE capacity.

I hereby declare under penalty of perjury that the foregoing declaration is true and correct to the best of my knowledge and belief. Dated this 1 day of March, 2012.



WILLIAM H. STONE

Maps Depicting Capacity Constraints in 18 Markets

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- **CMA Population: 493K**

- **700 Upper C**
- **AWS-F**

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